



Dentsply / York Division

6520-01-045-6407

# **DENTSPLY®/CAVITRON®**

## **MODEL 2001™**

**ultrasonic dental unit  
with automatic fine tuning.**

**INSTALLATION  
AND  
SERVICE MANUAL  
DOMESTIC and EXPORT MODELS**

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Dentsply International Inc., York Pennsylvania 17405

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## FOREWORD

The Dentsply® Cavitron® 2001™ Ultrasonic Dental Unit is precision engineered and manufactured. Designed for use in prophylaxis treatment, periodontia and other areas of operative dentistry, the Unit is manufactured by the Cavitron Division of Cooper Medical Devices Corporation, New York, NY and distributed by Dentsply International Inc.

Essentially, the Unit operates by converting ordinary AC house current into 25,000 Hz current. This in turn is converted by means of the handpiece and insert into 25,000 microscopically small mechanical strokes per second. These rapid, microscopic strokes are then transmitted to the insert tip. Applied with a water spray and a light guiding touch, the activated tip, in conjunction with the bubbling action of the water, rapidly and gently dislodges calculus and stain.

### CAUTION

The Dentsply-Cavitron Unit should not be used for restorative dental procedures involving the condensation of Amalgam.

PRECAUTIONS: No special maintenance is required for the Dentsply-Cavitron Ultrasonic Dental Unit, but the following precautionary measures should be exercised:

- a. Do not place the Unit on or next to a radiator or other heat source as this may damage the electronic components.
- b. Do not keep the Unit in a tightly confined space or corner. Keep it where a normal amount of air will freely circulate on all sides of the cabinet.
- c. The Unit is portable, but when carrying it from one place to another, handle it with care.
- d. THE IMPORTANCE OF THE FOLLOWING INSTRUCTIONS OUTLINED IN THE DENTIST'S INSTRUCTION MANUAL CANNOT BE OVEREMPHASIZED. IMPROPER ANGULATION OF THE INSERT TIP TO THE TOOTH WILL DEFINITELY RESULT IN SUB-STANDARD PERFORMANCE OF THIS PRECISION EQUIPMENT.

### WARNING

WE RECOMMEND THAT THE ULTRASONIC UNIT NOT BE USED IN CASES WHERE A PATIENT OR AN OPERATOR OF THE UNIT HAS BEEN FITTED WITH A CARDIAC PACEMAKER.

For further information on this subject, we suggest you refer inquiries to Annals of the New York Academy of Sciences, Vol. 167, Article 2, pages 515-1075, "Advances in Cardiac Pacemakers", U.S. Department of Health, Education and Welfare, "Electromagnetic Radiation Interference with Cardiac Pacemakers", and the Journal of the American Dental Association, Vol. 91, No. 6, Pages 1224-1229, "The Individual with a Pacemaker in the Dental Environment."

**DENTSPLY® CAVITRON® MODEL 2001**  
**SPECIFICATIONS**

**ELECTRICAL**

Voltage: 100V, 115V, 220V  
& 240V  
Current 0.8 amps at 100V  
& 115V  
0.4 amps at 220-  
& 240V  
Frequency: 50/60 Hertz

**WATER**

Pressure: 30-60 PSI (2.1 - 4.2 Kg/cm<sup>2</sup>)  
Flow Rate: OFF position (counterclockwise 360°) - 25cc max  
ON position (clockwise 360°) - 50cc min

**DIMENSIONS**

Generator	Height	4 in. (10.1 cm)
	Width	10-1/2 in. (26.7cm)
	Depth	10-1/2 in. (26.7cm) over strain relief
Handpiece Cable	Length with reel	82 in. (208cm)
	Standard Length	80 in. (203cm)
Footswitch Cable	Length	96 in. (244cm)
Linecord	Length	84 in. (214cm)
Water Hose	Length	96 in. (244cm)

**WEIGHT** 11 lbs. 7 oz. (5.2 Kg)

## SECTION I

### DESCRIPTION

#### COMPONENTS

The Unit has four major components: an electronic generator, a handpiece assembly (retraction reel optional), a set of interchangeable inserts, and a foot (fingertip control optional) control.

#### 1. GENERATOR AND WATER SYSTEM

The electronic generator enclosed in the cabinet produces the power required for activating the handpiece. The following controls are found on its control panel (Figure 1):

- a. Power Adjustment Dial (1) to switch the Unit on and off and to select the 1, 2, or 3 power levels of operation.
- b. Water Flow Adjustment Knob (2) for adjusting the volume of water permitted to flow from the handpiece. The greater the water flow, the lower the water temperature; the lesser the water flow, the higher the water temperature.
- c. On-Off Pushbutton turns the Unit on.
- d. On-Indicator Light (4) illuminates when the Unit is on.
- e. Handpiece (5).



1 - Power Adjustment Dial	4 - On-Indicator Light
2 - Water Flow Adjustment Knob	5 - Handpiece
3 - On-Off Pushbutton	

FIGURE 1. UNIT CONTROL PANEL

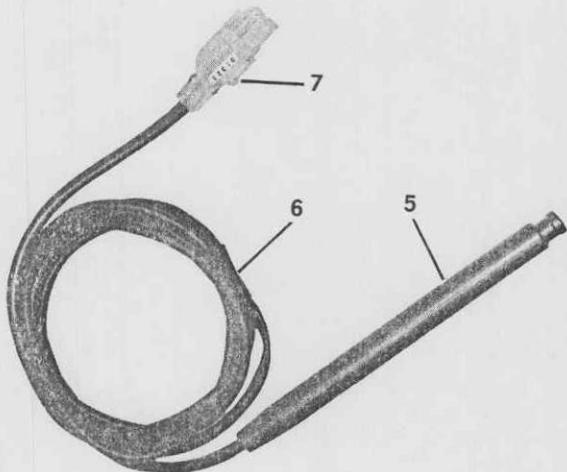
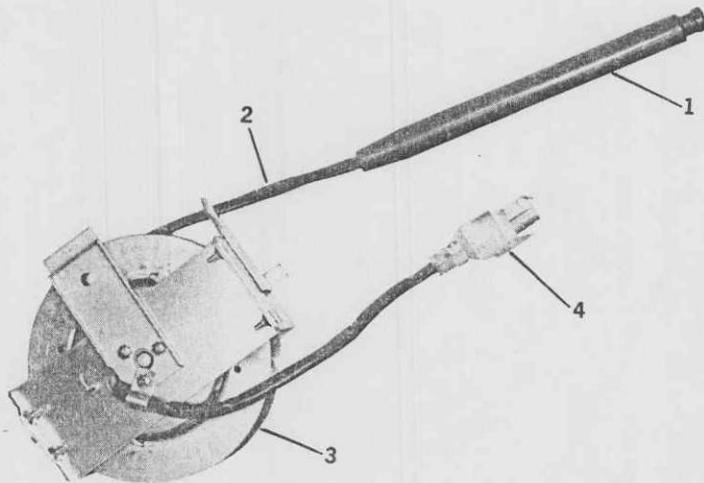
## 2. HANDPIECE AND CABLE ASSEMBLY

The Handpiece and Cable Assembly (Figure 2) consists of a handpiece which is the housing for the interchangeable inserts, and a cable which can be optionally attached to a retraction reel.

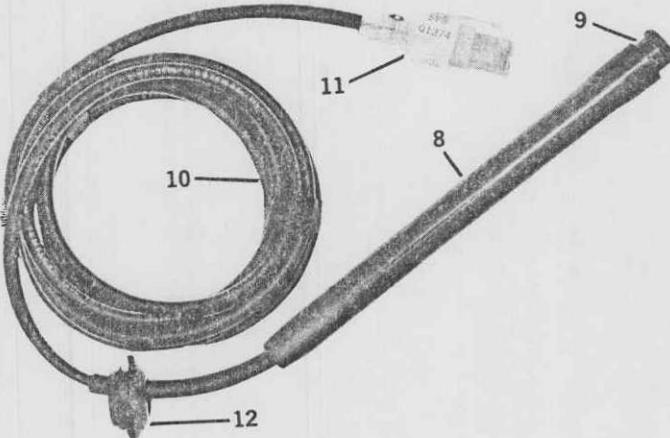
- a. The open end of the handpiece is designed to accept inserts of various tips (see Figure 3). To change inserts, simply pull out one and place in another, making certain that it is fully seated. **WITH INSERT IN PLACE, HOLD HANDPIECE IN AN UPRIGHT POSITION. ACTIVATE THE INSERT TO BLEED ANY AIR BUBBLES THAT MIGHT BE TRAPPED WITH THE HANDPIECE.** (With the finger switch handpiece, hold the switch "ON" until the water flows without spouting.)

Standard Handpiece  
with Reel

- 1 - Handpiece
- 2 - Cable
- 3 - Retraction Reel
- 4 - Connector
- 5 - Handpiece
- 6 - Cable
- 7 - Connector
- 8 - Handpiece
- 9 - Finger Switch
- 10 - Cable
- 11 - Connector
- 12 - Strain Relief

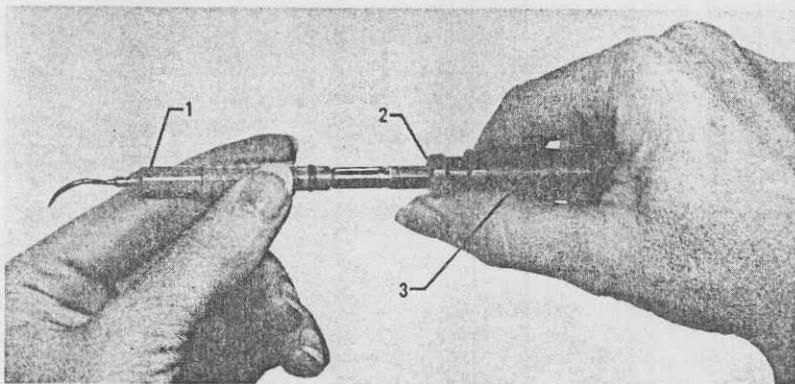


Standard Handpiece without Reel



Finger Switch Handpiece

FIGURE 2. HANDPIECE AND RETRACTION REEL ASSEMBLY



1 - Insert  
2 - Open End of Handpiece  
3 - Handpiece

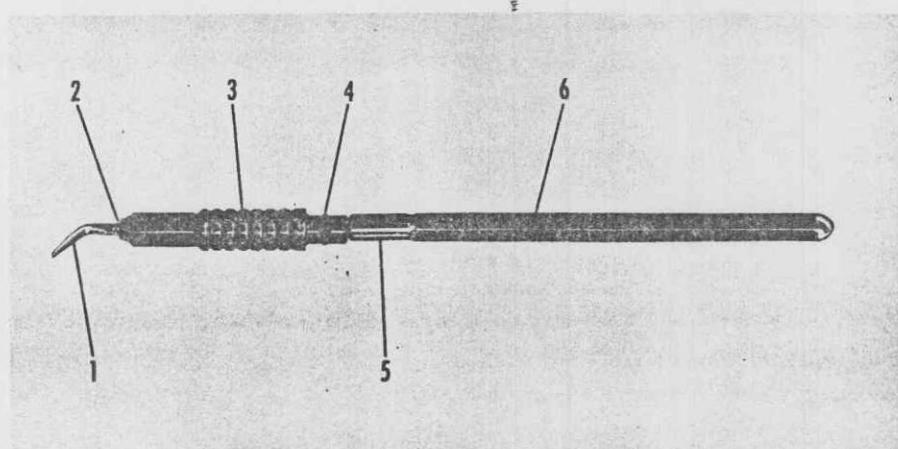
FIGURE 3. PLACING INSERT INTO HANDPIECE

**CAUTION**

If the insert does not readily snap into the handpiece moisten the "O" ring, located immediately below the collar. (See Figure 4.) DO NOT FORCE into place. On handpiece with the finger switch, twist the insert clockwise as it is pushed into the handpiece.

- b. The handpiece, with the insert in place, converts electrical power, supplied by the generator, into microscopically small strokes which activate the insert tip. A continuous flow of water is required to keep the handpiece cool. This same water, warmed within the handpiece, is then delivered through the water outlet and sprayed by the activated tip.
- c. The optional finger switch is located at the forward end of the handpiece and controls the ON-OFF function of the handpiece. Flick the finger switch once and the handpiece instantly delivers the selected power and water flow. Flick the finger switch again and the handpiece is OFF.

Units with the finger switch will automatically shut OFF if the finger switch is actuated with no insert in the handpiece.



1 - Insert Tip  
2 - Water Outlet  
3 - Collar  
4 - O-Ring  
5 - Connecting Body  
6 - Magnetostrictive Stack

FIGURE 4. "THRU-FLOW"® INSERT COMPONENTS

### 3. "THRU-FLOW"® INSERTS

The unit is used with quick-change interchangeable inserts designed to provide ready access to all areas of the mouth. The handpiece accepts all standard available DENTSPLY-CAVITRON inserts.

"THRU-FLOW" INSERT COMPONENTS: The "Thru-Flow" insert is made up of the following components:

- a. Insert Tip (1).
- b. Water outlet (2) for spraying preheated water at the activated tip. The insert's design ultrasonically transports lavage water along the entire working length of the tip.
- c. Collar (3).
- d. O-Ring (4) which acts as a water seal when the insert is placed into the open end of the handpiece.
- e. Connecting body (5) which transmits motion from the stack to the insert tip.
- f. Magnetostrictive Stack (6) which converts electrical power supplied to the handpiece into mechanical oscillations used to activate the insert tip.

### 4. FOOT CONTROL

The handpiece is operated by an on-off contact foot switch which functions as follows:

- a. With the foot held down on foot control pedal, the handpiece is activated and water flows.
- b. With foot removed from pedal, both handpiece and water flow are shut off.

A finger switch on the handpiece is available as an option for controlling the handpiece. See "Handpiece and Cable Assembly" for description.

## SECTION II

### INSTALLATION

#### 1. ELECTRICAL REQUIREMENTS - U.S. ONLY.

A 3-prong type grounded wall outlet is required, supplying 115 volts, 50/60 Hertz AC current. Grounding reliability can only be achieved when the unit is connected to an equivalent receptacle marked "hospital only or hospital grade." DO NOT REMOVE GROUND LUG FROM PLUG.

#### 2. INSTALLATION

On receipt of equipment, unpack carefully. Check that the ON-OFF switch (Figure 1 Item 3) is in the "OFF" (out) position and complete the installation.

#### 3. POWER CABLE

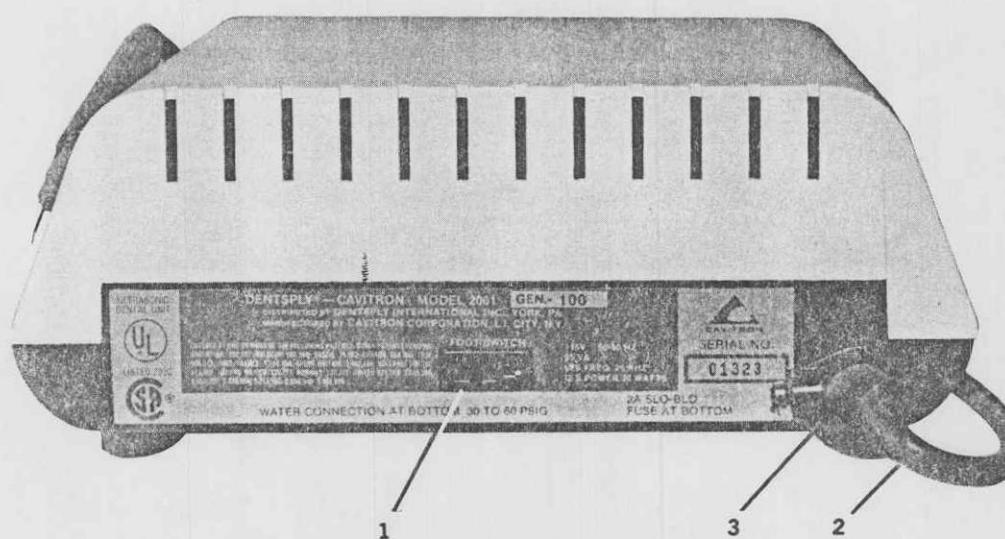
On all units the power cable is already attached to the unit.

All 100-115 volt units contain a 3-prong plug on the end of the power cable. Units for Scandinavian countries (NEMCO) contain a third wire. The plug on all other 220-240 volt units around the world will contain two prongs.

Check that the ON-OFF Pushbutton is in the "OFF" (out) position, then insert plug into wall outlet.

#### 4. FOOT CONTROL

On units with a foot control, insert connector of foot control cable into 3-hole receptacle (Figure 5 Item 1) on rear panel of cabinet. The 100-115 volt models with foot control have a 3-pin plug. The 220 volt units for Scandinavia have a 3-pin plug. All other 220-240 volt units around the world have a 2-pin plug.

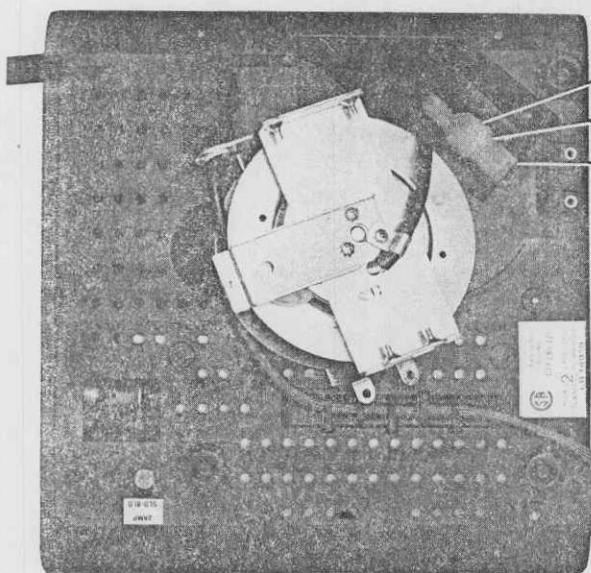


- 1 - Foot Control Cable Receptacle
- 2 - Power Cable
- 3 - Rubber Foot

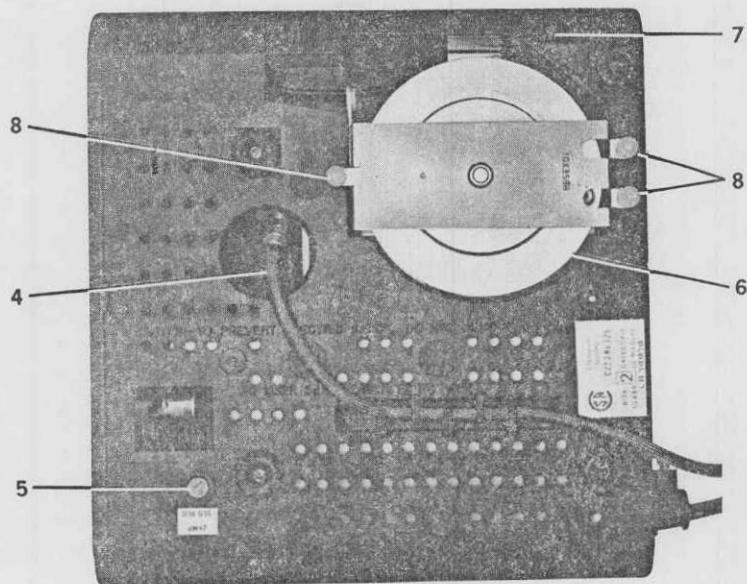
FIGURE 5. REAR PANEL — U.S. MODEL SHOWN

## 5. WATER SUPPLY

One end of the water supply hose is attached to the unit at the factory (see Figure 6). The water supply to the unit should be limited to 30 psi minimum and 60 psi maximum pressure. It is recommended that a manual shut-off be installed in the water line to the unit so the water can be completely shut off when the office is unoccupied. Attaching the water hose from the unit to this line is accomplished using an adapter suitable for the installation. NOTE: A strainer is recommended for installation in the water supply to the unit. Immediately after the adapter is connected to the line, flush the adapter fitting of any debris created by the connection. With the adapter fitting flushed, connect the free end of the supply hose to the adapter fitting. Test the connection to make sure it is tight. If incoming water pressure is above 60 psi install a water pressure regulator in the main water supply line.



1. Lock Lever
2. Receptacle J-4
3. Plug P-4



- 4 - Water Supply Hose
- 5 - 2 Amp Slo Blo Line Fuse
- 6 - Handpiece Cable Retraction Reel
- 7 - Cover Mounting Screw
- 8 - Reel Mounting Screw

FIGURE 6. BOTTOM PANEL — U.S. MODELS SHOWN

## 6. HANDPIECE

The handpiece (standard or finger switch) and cable assembly is attached to the Unit at the factory.

As an OPTION the standard handpiece and cable assembly is mounted on a retraction reel in the Unit. Remove the handpiece from the holder and pull the hose to the desired position and lock. There is a lock position every few inches as the handpiece is withdrawn from the Unit. The handpiece cable can be extended approximately 7 feet.

### NOTE

If hose does not lock, pull a slight amount, until hose is locked.

To retract the hose, give a slight tug and allow the handpiece to return to the Unit.

## 7. THRU-FLOW® INSERT

Lubricate "O" ring on insert (see Figure 4) with water to facilitate insertion into the handpiece. Push the insert in with a clockwise motion.

## SECTION III

### POST-INSTALLATION CHECK

#### 1. ELECTRICAL

Check to make sure that the Slo Blo fuse cap (see Figure 6 item 2) on the bottom of cabinet is securely locked in place. Actuate the ON-OFF pushbutton to "ON". The "ON" indicator will light.

#### 2. FOOT CONTROL OR FINGER SWITCH CONTROL

Place TF1-3 insert into handpiece. Set the Power Adjustment Dial at either 2 or 3, then check the functioning of control as follows:

- a. Step on foot control or flick the finger switch once. Insert should become activated and water should flow from insert water outlet. If no water flows from water outlet, turn Water Flow Adjustment Knob (see Figure 1) in a clockwise direction until water flow begins.
- b. Release foot control or flick the finger switch again. Both handpiece operation and water flow should stop.

#### 3. WATER FLOW AND ADJUSTMENT

The Water Adjustment Knob regulates the volume of water and therefore the temperature of the water flowing from the insert water outlet.

Adjusting Water Flow. With the Power Adjustment Dial set to either 1, 2, or 3, step on foot control or flick finger switch and adjust the volume of water flowing from the handpiece water outlet as follows:

- a. To increase water flow, turn Water flow Adjustment Knob in a clockwise direction until the desired rate of flow is obtained. At least 35cc of water per minute is needed to keep the handpiece cool.
- b. To decrease flow, turn Water Adjustment Knob in a counterclockwise direction until the desired rate of flow is obtained.
- c. Increasing the power level will cause the water in the handpiece to heat faster, while reducing the power level will cause the water to heat at a slower rate.

#### NOTE

The operator should bleed any air from the handpiece that may become trapped there during the changing of an insert. This will prevent handpiece overheating. (Refer to "Instructions for Using Dentsply® -Cavitron® Ultrasonic Dental Unit" - Page 8.)

## CAUTIONS

In order to reduce bacteria that may have accumulated in the instrument overnight, the water line should be flushed for a period of 2-5 minutes daily prior to use.

Whenever the insert tip is placed within the patient's mouth, the lip should be retracted to prevent contact with the insert tip.

Inserts should be replaced after one year's usage in order to maximize cleaning efficiency and avoid breakage. Insert tips that have been bent, scratched or dropped should be discarded immediately to avoid breakage.

## SECTION IV

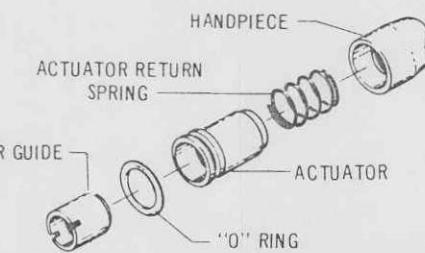
### SERVICE AND REPAIR

The Dentsply-Cavitron Model 2001 Ultrasonic Dental Unit requires little or no service. If service should be necessary, the following measures will eliminate most difficulties you may encounter. Where more than one corrective measure is shown, follow the indicated sequence. If the corrective measures fail, the unit should be returned to Dentsply International Inc.

SYMPTOMS	CAUSES	CORRECTIVE MEASURES
Water drip from hand-piece when unit not operating.	Water solenoid valve open. (SV1)	Repair or replace solenoid valve.
Loud hum from generator.	Air trapped in water regulator. (WR1)	1. Tilt unit at different angles with handpiece activated. 2. If problem persists, replace regulator.
	High water pressure.	Install water pressure regulator on main water supply line and reduce pressure to 60 psi.
Insert stops vibrating when coming in contact with tooth.	Insert malfunction.	Test with another insert. If test insert works properly, original insert is damaged.
	Insert not pushed in far enough for automatic pick-up.	Check if insert seats in handpiece.
	Malfunction of handpiece assembly.	Check continuity of handpiece lines. Refer to schematic, Figure 8 or 9 as applicable.  1. Connect ohmmeter between terminal, P4-1 and P4-4. 2. Connect ohmmeter between P4-5 and P4-4* Flex handpiece line and check for intermittent operation.  *If ohmmeter reading is not constant or not reading, handpiece and cable assembly is likely to be damaged and should be repaired or replaced.
	Loose wiring or defective solder joint in unit wiring.	Visual check of all unit wiring.

SYMPTOMS	CAUSES	CORRECTIVE MEASURES
Insert fails to vibrate, either intermittently or at all times, or handpiece heats up.	Polarizing current too low, insert fails to vibrate. Polarizing current too high, handpiece heats up.	Measure polarizing current by disconnecting one of the leads to SV1 and insert ammeter. Reading should be $2.5 \pm 0.30$ Amps DC. If reading is not within limits, check R14, R-37, K1.
Slo Blo Fuse F1 fails.	Short or failure within unit.	<p>Disconnect push-on terminal from transformer to rectifiers CR1 and CR2 (take care that disconnected terminals do not short together or to chassis).</p> <p>(a) If fuse continues to blow then short is from transformer back such as: Transformer T2 check for short. Switch S1 - check switch for short. Pilot Light L1 - check for short.</p> <p>(b) If fuse does not blow, then disconnect remaining push-on terminals to rectifier CR1 and check: Rectifiers CR1 and CR2 - check for shorts.</p> <p>(c) If step (b) is completed without finding problem leave rectifiers CR1, and CR2 disconnected, and remove PC board and disconnect one push-on connector to solenoid Valve and check: Capacitor C7 - check for shorts. Capacitor C9 - check for shorts.</p> <p>(d) Check diode CR9 for short.</p> <p>(e) If steps above are completed without finding problem. Check transistors Q1 and Q2 for shorts. Replace as required.</p> <p><b>NOTE:</b> Faults listed in (b), (c), (d), and (e) will cause the auxiliary fuses F2, F3 or F4 to blow on the 220V and 240V models.</p>
Slo Blo Fuse F1 good. No power to circuitry. Thermal cut-out built into transformer opens.	Unit is installed in a confined area (such as a cabinet), or is too close to heat source to insure proper air circulation around unit.	Provide adequate air circulation around unit. If installed in cabinet, drill holes in bottom or back of cabinet for better air circulation.
No power to unit.	Faulty wall outlet or unit cord.	<ol style="list-style-type: none"> <li>1. Check wall outlet and if faulty take necessary corrective measures.</li> <li>2. Check unit cord from unit to outlet. Replace if damaged.</li> </ol>
	Fuse F1 blown.	Replace fuse F1 or fuse assy.
	Damaged ON/OFF switch.	Replace ON/OFF switch. (S1)
Continuous clicking or no click at all when stepping on foot switch.	Damaged foot switch.	Check foot switch by removing foot control plug from rear of the unit. If defective, repair or replace.

SYMPTOMS	CAUSES	CORRECTIVE MEASURES
Continuous clicking or no click at all when flicking fingertip control.	Damaged fingertip control.	1. Connect clip lead between C9+ and J1-14. If Unit functions properly, replace fingertip control. 2. If step one (1) is completed without finding problem, replace Q6.
	Damaged electronic component.	
Handpiece heats up.	Insufficient water to cool handpiece.	Turn water adjustment knob clockwise until handpiece runs cool.
	Air trapped in handpiece.	When inserts are changed, hold the handpiece in an upright position until trapped air is removed and water flows properly.
Water spray from insert not properly covering operating area of activated insert tip.	Improper water flow adjustment.	Refer to "Instructions For Using Dentsply® - Cavitron® Ultrasonic Dental Unit" (Dentists' Manual), for instructions on water flow adjustment.
Water leak from handpiece when in operation.	"O" Ring worn on insert. Water leak in plastic water line at handpiece or within unit.	Replace "O" Ring. Replace handpiece and cable assembly.
Insert vibrates but no water, or insufficient water volume, flows from handpiece.	Faulty water supply to unit.	Check water supply line to unit and take necessary action to insure volume.
	Damaged water regulator.	Repair or replace water regulator.
	Obstruction or mineral deposits in water system in unit.	1. Remove insert and turn water valve full open. Observe water flow. If flow is good then obstruction is in insert. Replace insert. 2. If obstruction is not in insert, then remove handpiece water line at solenoid and check water flow. If flow is good then obstruction is in handpiece supply line. Replace handpiece and cable assembly.
Water flow not controllable by turning water adjustment knob.	Malfunction of water regulator.	Repair or replace water regulator.
Inserts do not fit handpiece properly.	"O" Ring on insert dry.	Lubricate "O" Ring with water. Replace if worn.

SYMPTOMS	CAUSES	CORRECTIVE MEASURES
Fingertip control comes free from hand-handpiece.	Threaded actuator guide is unscrewed.	Replace items per sketch. 
Insert does not vibrate when the fingertip control is operated.	Defective fingertip control.	Disconnect handpiece connector from generator. Connect ohmmeter between P4-3 and P4-4.  Check that contacts close when fingertip control is moved back and that they open when fingertip control is released.
	Defective electronic component.	Replace Printed circuit board PC1.
Tip vibrates when unit is turned on.	Defective electronic component.	Use fingerswitch to turn unit off a. Unit turns off check voltage Q5-4. 1. Less than 1.6 volts replace Q5. 2. Greater than 1.6 volts replace IC2. b. Unit fails to turn off. 1. Replace IC3 and/or Q3.
Vibration stops after short 2 sec. ON time.	Defective electronic component.	a. U/S Off Measure voltage* at C14 + if Less than 0.5 volts replace Q4. b. U/S On measure voltage at IC4-8 if greater than 3.0V replace IC4. c. If replacing IC-4 does not eliminate problem, readjust R27 until voltage at IC4-8 meets the values listed in Table I with U/S on and insert is removed, voltage must be greater than 3.5V. *Use high impedance DVM.  Check if relay is operating.
No vibration, no water.	Defective component.	a. Yes. Check polarizing circuit CR2, C9, SV1, R14, and R37. b. No. 1. Check wiring to relay and footswitch. 2. Replace relay.

## SECTION V

### ASSEMBLY AND DISASSEMBLY PROCEDURE

#### CAUTION

Disconnect power to unit before attempting these procedures.

#### 1. UNIT COVER DISASSEMBLY.

- a. Remove the four cover mounting screws and lift cover from unit.

#### 2. HANDPIECE AND CABLE ASSEMBLY REMOVAL.

Before removing the handpiece from any type unit, remove the large grommet from the handpiece cable hole in the front panel. Remove the grommet from the Handpiece and Cable Assembly.

#### UNITS WITH REEL

- a. Remove the three screws, Figure 6, item 8, and lift the retraction reel, item 6, to expose the connector plug.
- b. Press the lock lever on the side of the plug, Figure 2, Item 4, and disconnect the plug from the receptacle.
- c. Guide the handpiece through the front panel and lift the entire Handpiece and Cable Assembly from the unit.

#### UNITS WITHOUT REEL

- a. Press the lock lever on the side of the plug, Figure 2, Item 7 or 11, as applicable and disconnect the plug from the receptacle.
- b. Guide the handpiece through the front panel and remove the Handpiece and Cable Assembly from the unit.

#### 3. REGULATOR AND SOLENOID ASSEMBLY REMOVAL.

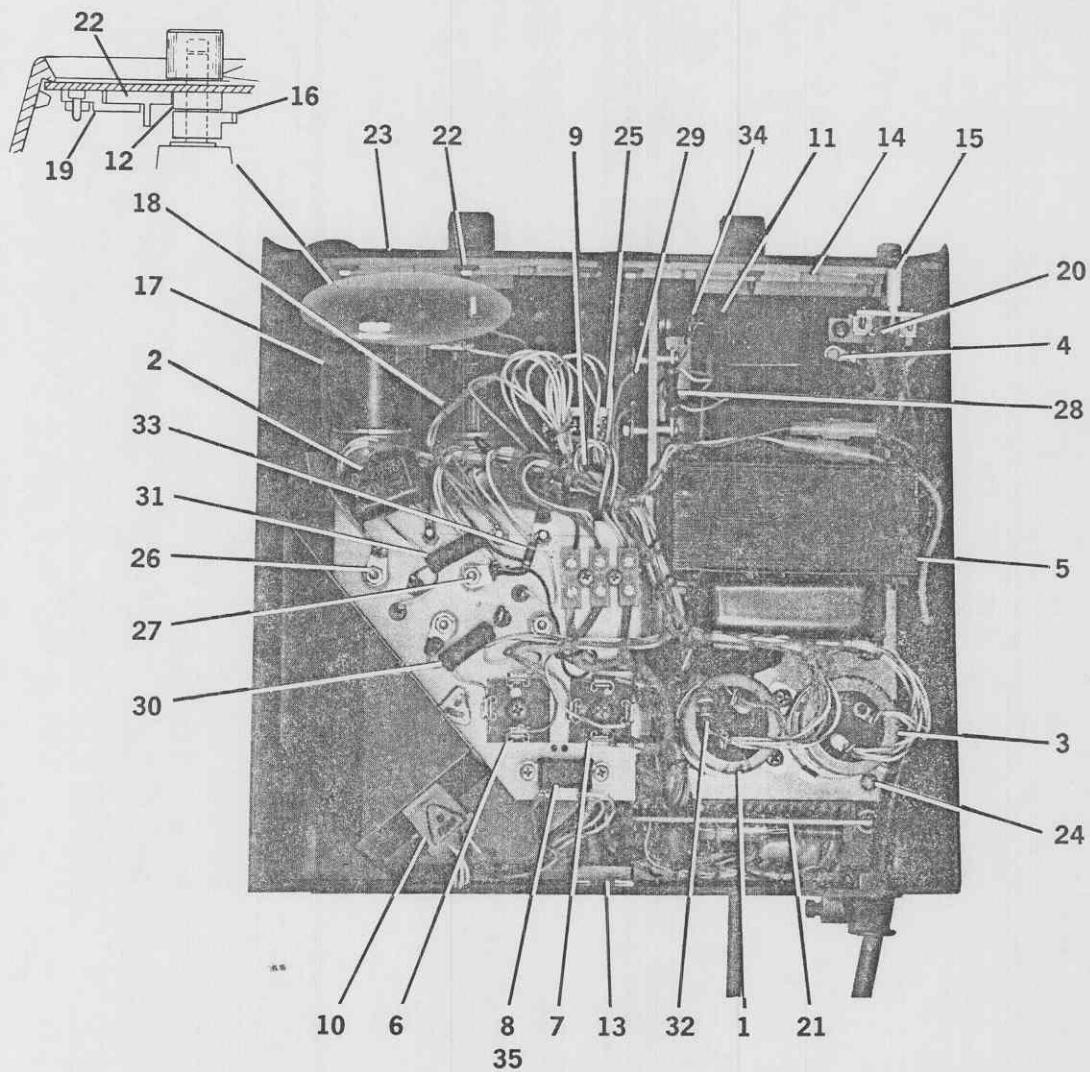
- a. Remove the P.C. board, Figure 7, Item 21, from its connector.
- b. Remove the two screws which mount the P.C. board connector to the chassis.
- c. Disconnect the main water line, Figure 6, Item 4, from the regulator under the unit and the small water line from the solenoid valve inside the unit.
- d. Remove the knobs from the Water and Power controls, push the ON/OFF button in and remove the front panel from the unit.
- e. Remove the four screws that attach the chassis to the cabinet base. See figure 7, Item 24.
- f. Tip the chassis so it rests on the side of the transformer and remove the wires from the solenoid.
- g. Remove the two screws from the rear of the chassis which attach the water regulator to the chassis.

#### 4. RELAY REMOVAL.

- a. Complete steps 3a through 3f (above).
- b. Remove the one screw from the rear of the chassis which attaches the relay.

#### 5. PC BOARD REMOVAL.

The PC board, Figure 7, Item 21, is removed from the unit by simply lifting it from its connector.



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Capacitor, C7	19	Rack Guide, DR
2	Capacitor, C3	20	Switch, S1
3	Capacitor, C9	21	Printed Circuit Board PC1
4	Fuse Holder, XF1	22	Water Indicator Assembly, DW1
5	Power Transformer, T2	23	Front Panel, FP1
6	Rectifier, CR2	24	Mounting Screw
7	Rectifier, CR1	25	Relay, K1
8	Resistor, R14	26	Transistor, Q1
9	Diode, CR9	27	Transistor, Q2
10	Handpiece Connector, J4	28	Resistor, R3
11	Potentiometer, R5	29	Resistor, R4
12	Spur Gear, DP2	30	Resistor, R10
13	Receptacle, J2	31	Resistor, R11
14	Power Indicator Assembly, DP1	32	Resistor, R12
15	Pilot Light, L1	33	Resistor, R26
16	Stop, DP3	34	Resistor, R36
17	Solenoid Valve, SV1	35	Resistor, R37
18	Water Regulator, WR1		

Figure 7. Component Removal

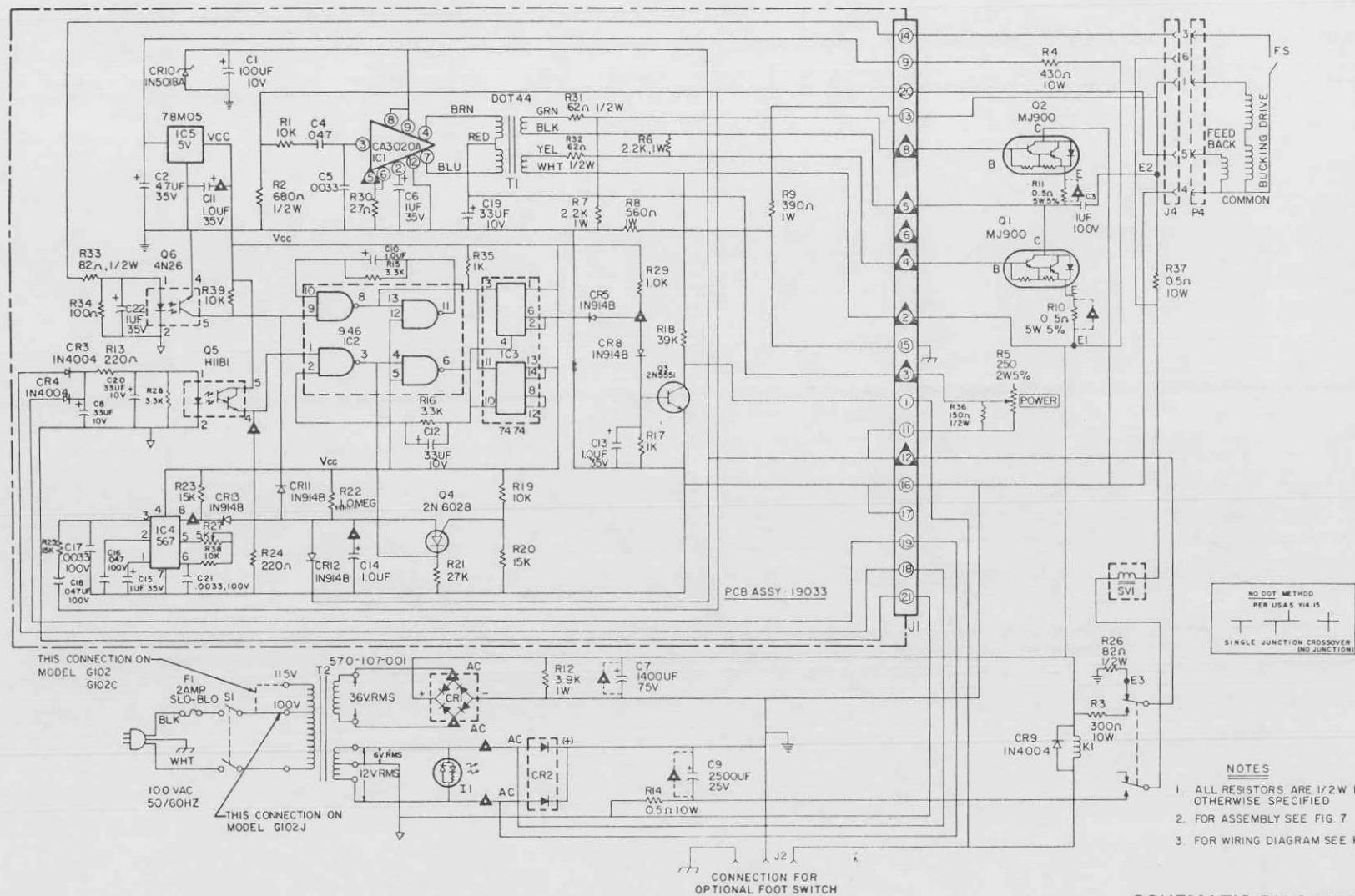


Figure 8a. Electrical Schematic (Finger Switch Handpiece) W/Test Point Locations

SCHEMATIC DIAGRAM  
100 & 115 VOLT AC  
MODELS: G102, G102C, G102J

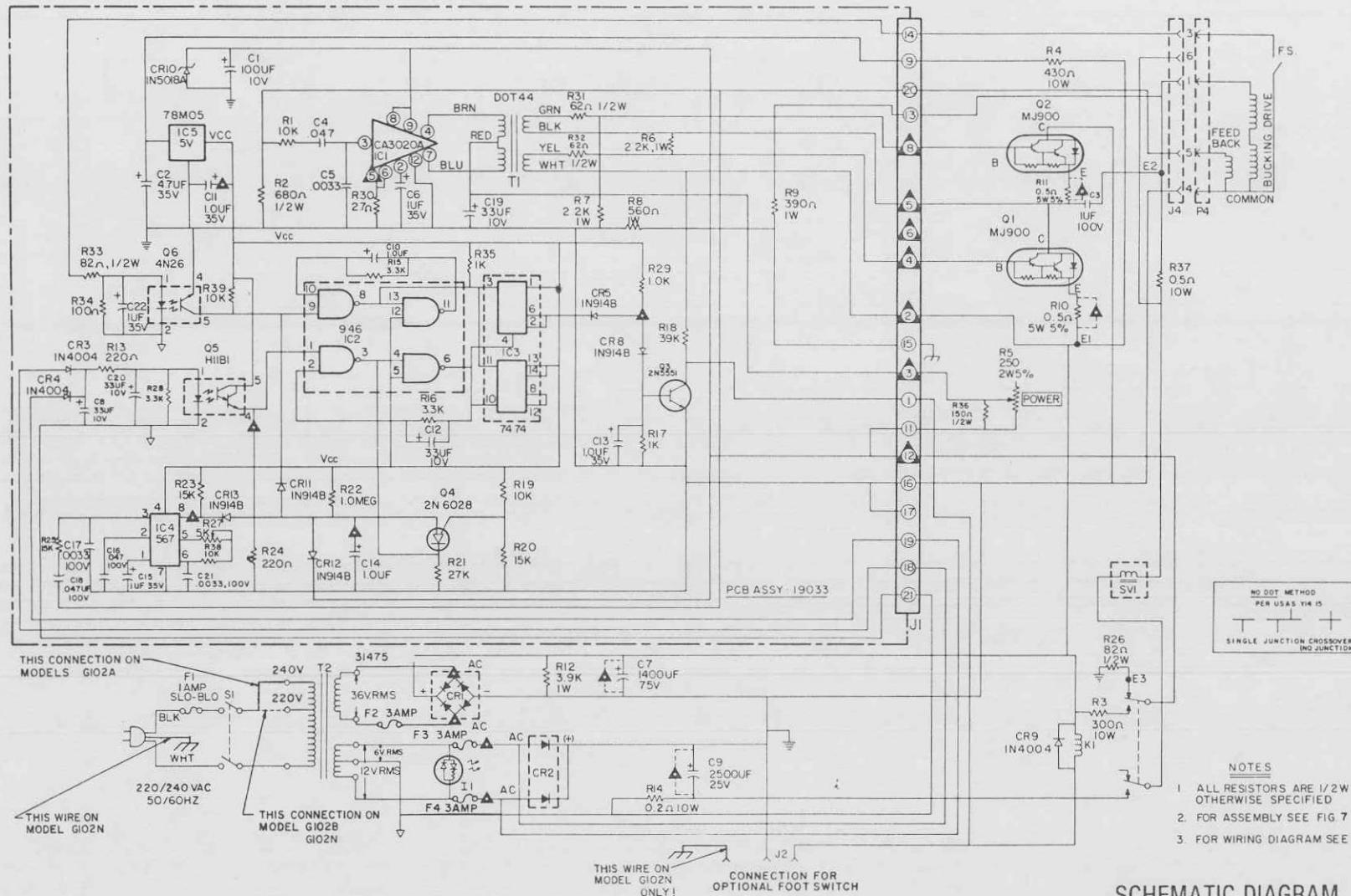
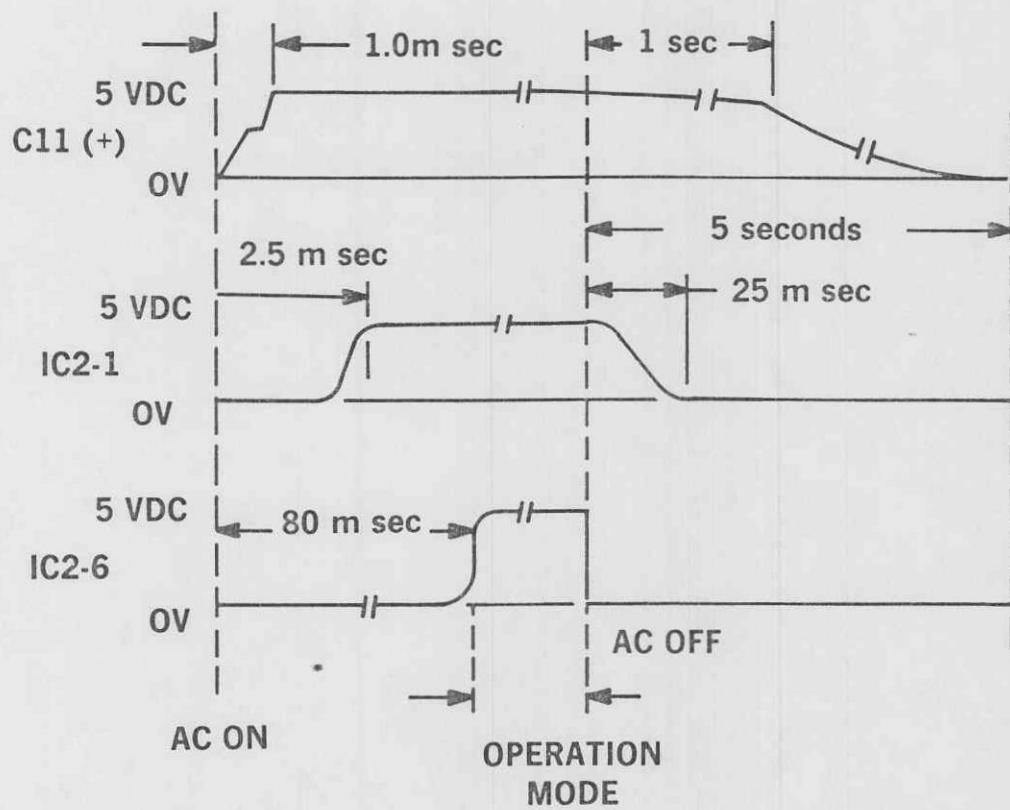


Figure 8b. Electrical Schematic (Finger Switch Handpiece) W/Test Point Locations

DENTSPLY — CAVITRON MODEL 2001 - FS  
GENERATOR 102 SERIES  
TYPICAL PRESET CIRCUIT WAVEFORMS



TEST POINT VALUES MODEL 2001 I-FS  
GENERATOR 102 SERIES

1. Line voltage for all measurements.  
110 VAC - G102J  
115 VAC - G102 & G102C  
220 VAC - G102B & G102N  
240 VAC - G102A
2. Polarizing current  $2.5 \pm 0.3$  amps DC measured in series with SVI at SVI.
3. P-3 or TF1-3 insert in handpiece with normal water flow thru insert.
4. Activate finger switch to turn U/S "ON" adjust power control to maximum.
5. Connect voltmeter test probes as indicated below.

TABLE I

VOLTMETER LOCATION	LIMITS			
	ULTRASONICS "ON"		MIN.	MAX.
	MIN.	MAX.		
I. P.C. BOARD COMPONENTS				
Between $\frac{1}{2}$ (C-9 +) and	J1-2	42.0 VDC	52.0 VDC	—
	J1-3	5.5 VDC	8.6 VDC	—
	J1-4	42.0 VDC	52.0 VDC	—
	J1-5	21.0 VDC	29.0 VDC	—
	J1-8	20.0 VDC	29.0 VDC	—
	J1-9	15.0 VDC	25.0 VDC	—
	J1-12	7.8 VDC	8.6 VDC	—
	IC1-5	0.25 VDC	0.50 VDC	—
	Q4-G	2.8 VDC	3.1 VDC	—
	Junction CR 5 & CR 8	1.75 VDC	1.75 VDC	0.72 VDC
	Q5-4	1.6 VDC	4.75 VDC	1.6 VDC
	C-11 (+)	4.75 VDC	5.25 VDC	4.75 VDC
	C-14 (+)	—	1.5 VDC	—
	IC4-8	—	0.5 VDC	3.5 VDC*
*INSERT OUT				
II. CHASSIS MOUNTED COMPONENTS				
Across R10	0.24 VAC	0.31 VAC		
Across R11	0.24 VAC	0.31 VAC		
Across C7	42.0 VDC	52.0 VDC		
Across C9	-3.5 VDC	-6.0 VDC		
III. OTHER TEST POINTS				
CR1 - Across AC and AC	36 VAC			
CR2 - Across AC and AC	12 VAC			

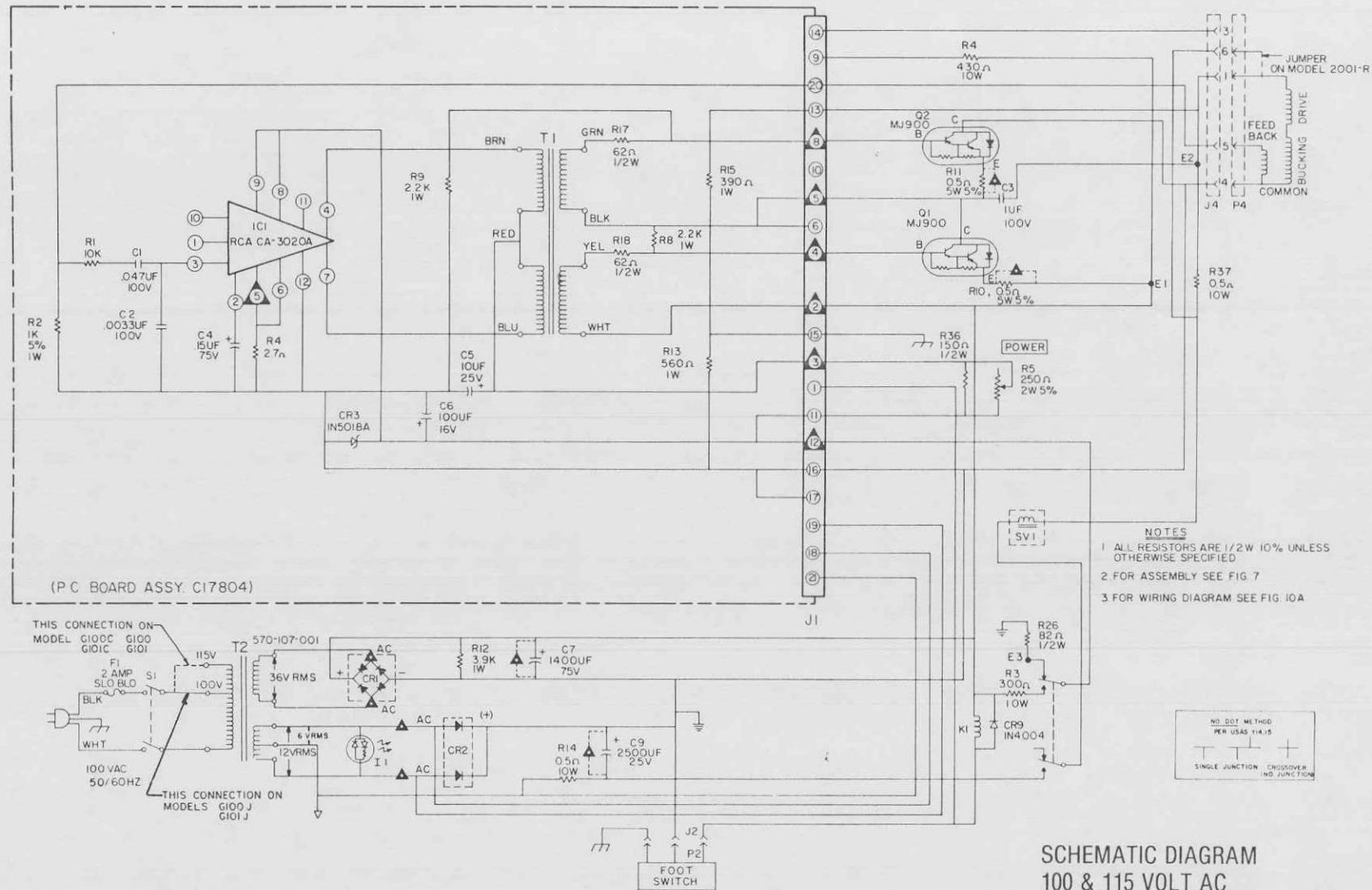


Figure 9a. Electrical Schematic (Standard Handpiece) W/Test Point Locations

SCHEMATIC DIAGRAM  
100 & 115 VOLT AC  
MODELS: G100, G100C, G100J  
G101, G101C, G101J

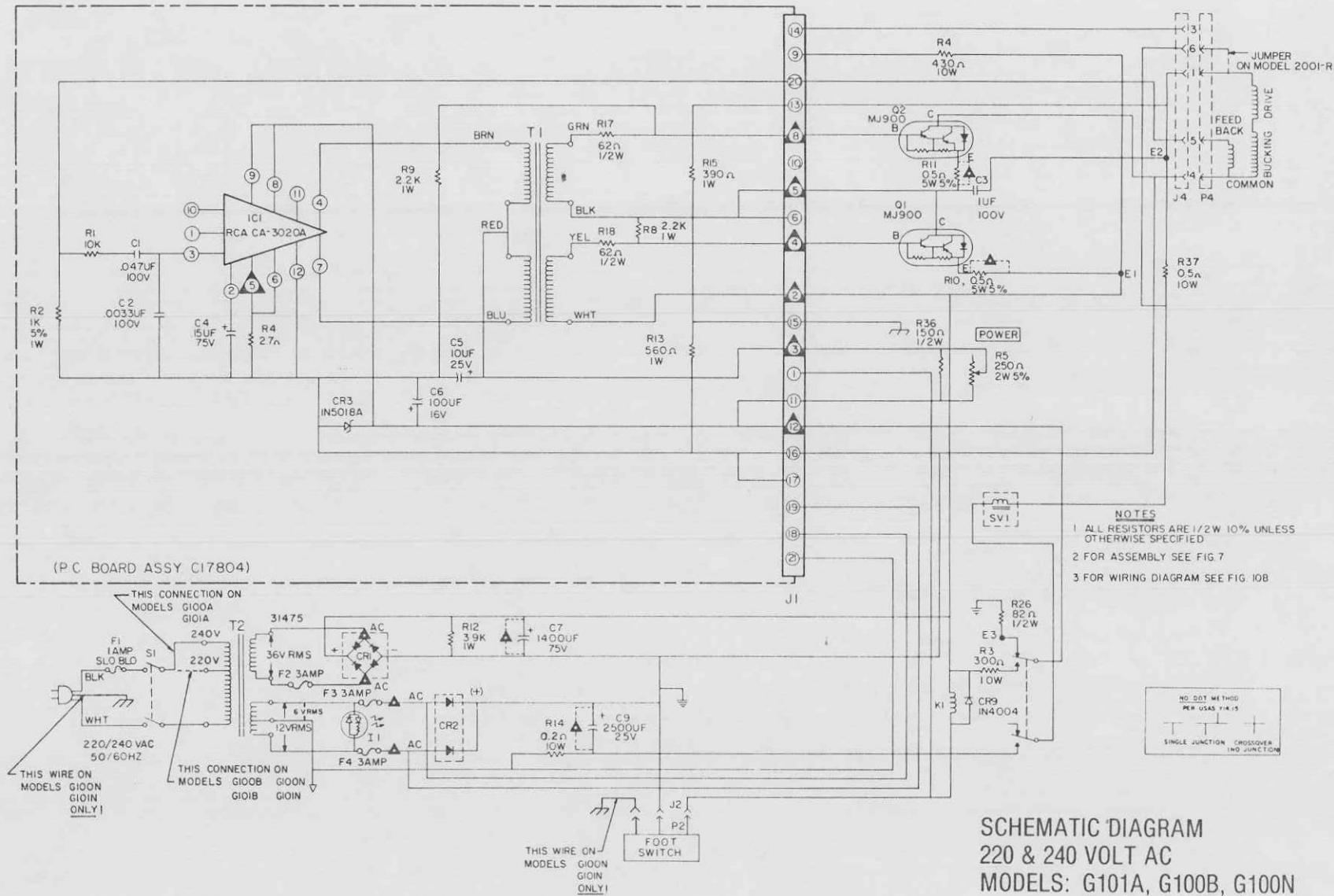


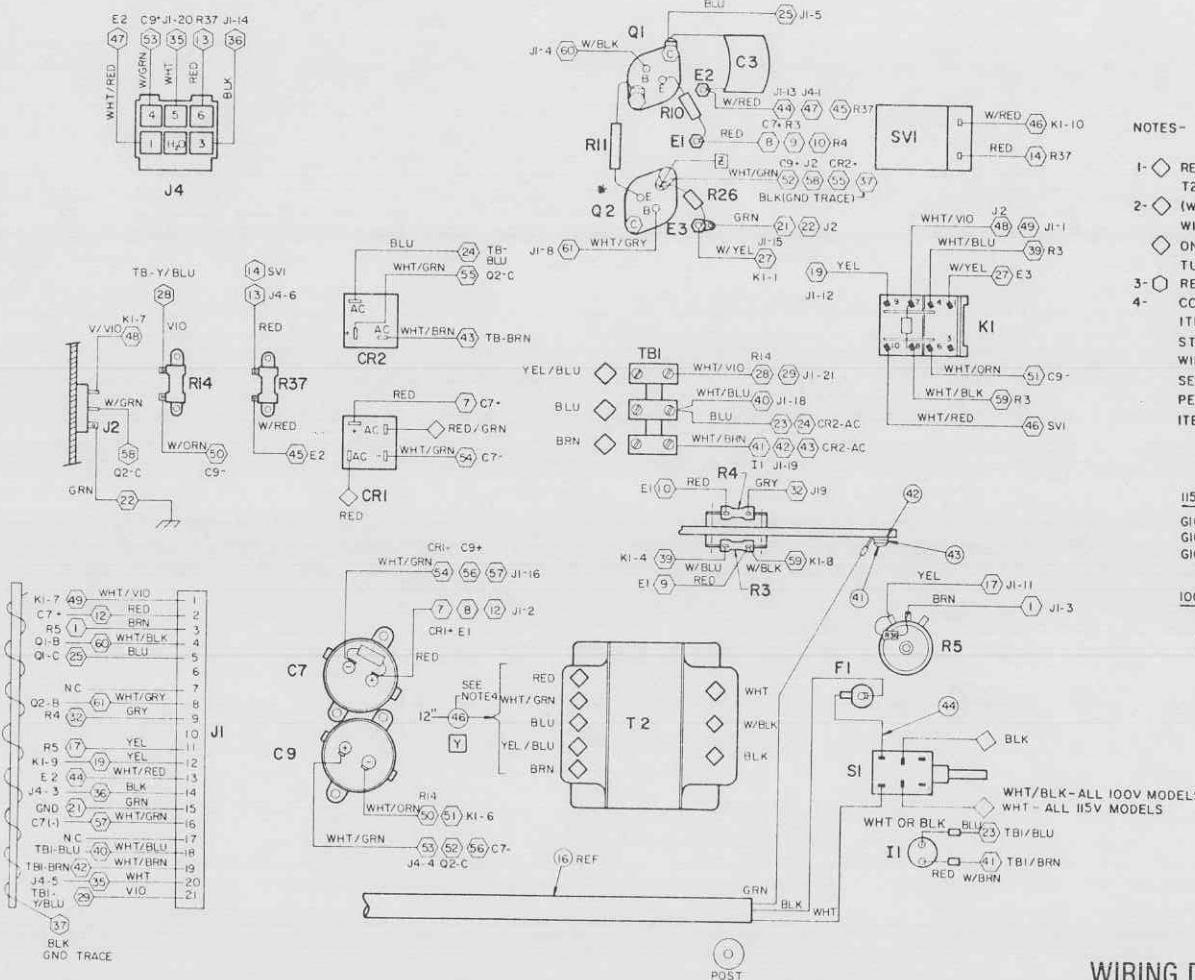
Figure 9b. Electrical Schematic (Standard Handpiece) W/Test Point Locations

TEST POINT VALUES MODELS 2001 GENERATOR SERIES 100 AND 2001-R GENERATOR SERIES 101

1. Line voltage for all measurements.      100 VAC - G100J & G101J  
115 VAC - G100 & G101; G100C & G101C  
220 VAC - G100B & G101B; G100N & G101N  
240 VAC - G100A & G101A
2. Polarizing current 2.5 ± 0.3 amps DC.
3. P-3 or TF1-3 insert in handpiece with normal water flow thru insert.
4. Adjust power control to maximum.
5. Connect voltmeter test probes as indicated below.

TABLE II

VOLTMETER LOCATION	LIMITS		
	ULTRASONICS "ON"		
	MIN.	MAX.	
I. P.C. BOARD COMPONENTS			
Between ÷ (C-9 +) and	J1-2	42.0 VDC	52.0 VDC
	J1-3	5.5 VDC	8.6 VDC
	J1-4	42.0 VDC	52.0 VDC
	J1-5	21.0 VDC	29.0 VDC
	J1-8	20.0 VDC	29.0 VDC
	J1-12	7.8 VDC	8.6 VDC
	1C1-5	0.25 VDC	0.50 VDC
II. CHASSIS MOUNTED COMPONENTS			
Across R10		0.24 VAC	0.31 VAC
Across R11		0.24 VAC	0.31 VAC
Across C7		42.0 VDC	52.0 VDC
Across C9		-3.5 VDC	-6.0 VDC
III. OTHER TEST POINTS			
CR1 - Across AC and AC		36 VAC	
CR2 - Across AC and AC		12 VAC	



**WIRING DIAGRAM**  
**100 & 115 VOLT AC**  
**MODELS: G100, G100C, G100J**  
**G101, G101C, G101J**  
**G102, G102C, G102J**

Figure 10a. Wiring Diagram

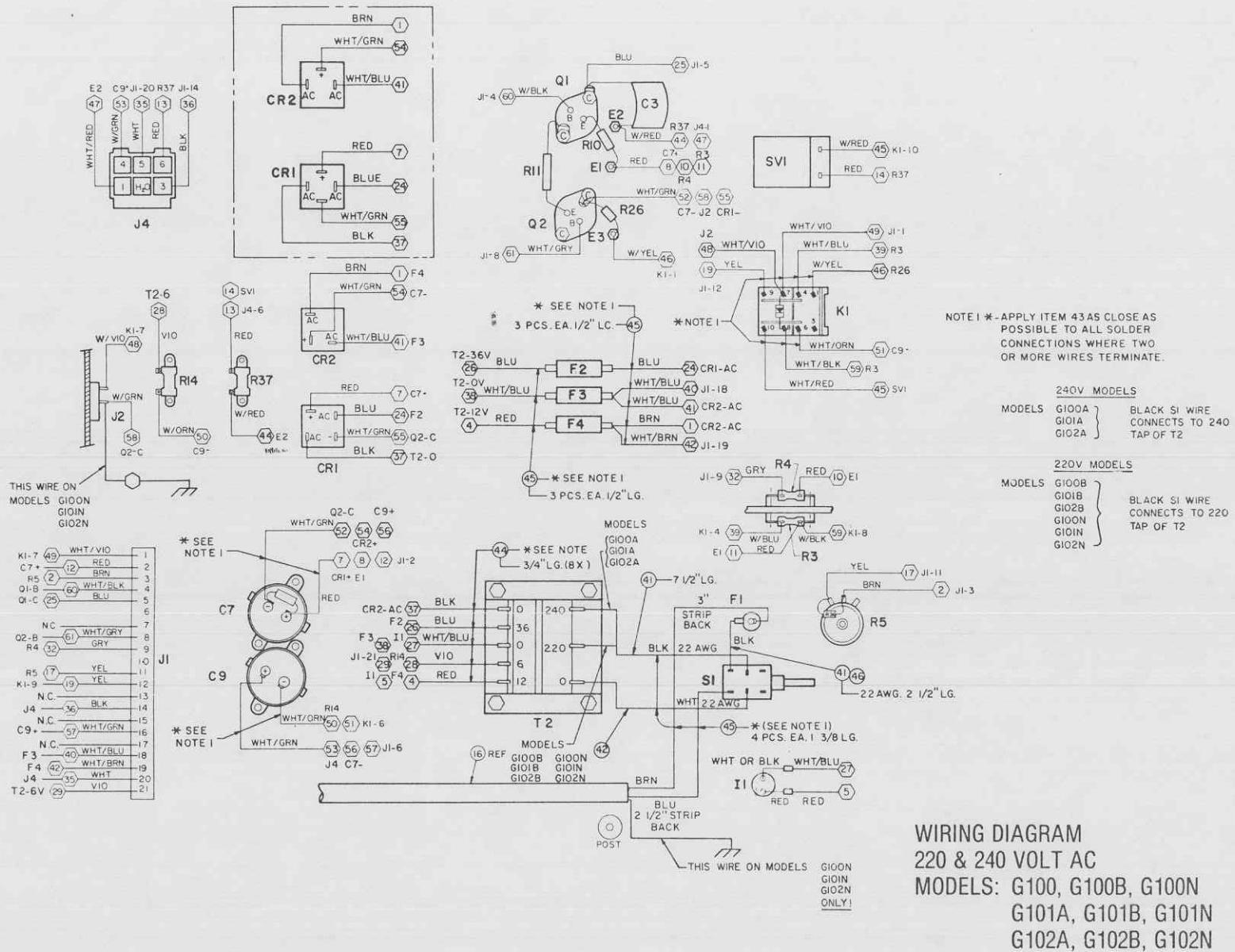


Figure 10b. Wiring Diagram

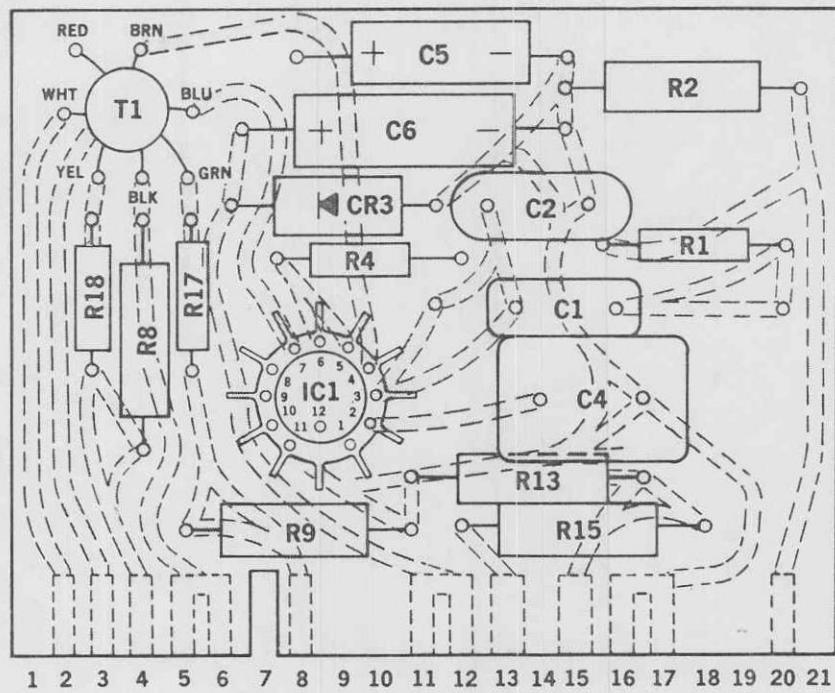


FIGURE 11. PRINTED CIRCUIT PARTS LOCATION  
(Standard Handpiece and Reel Units)

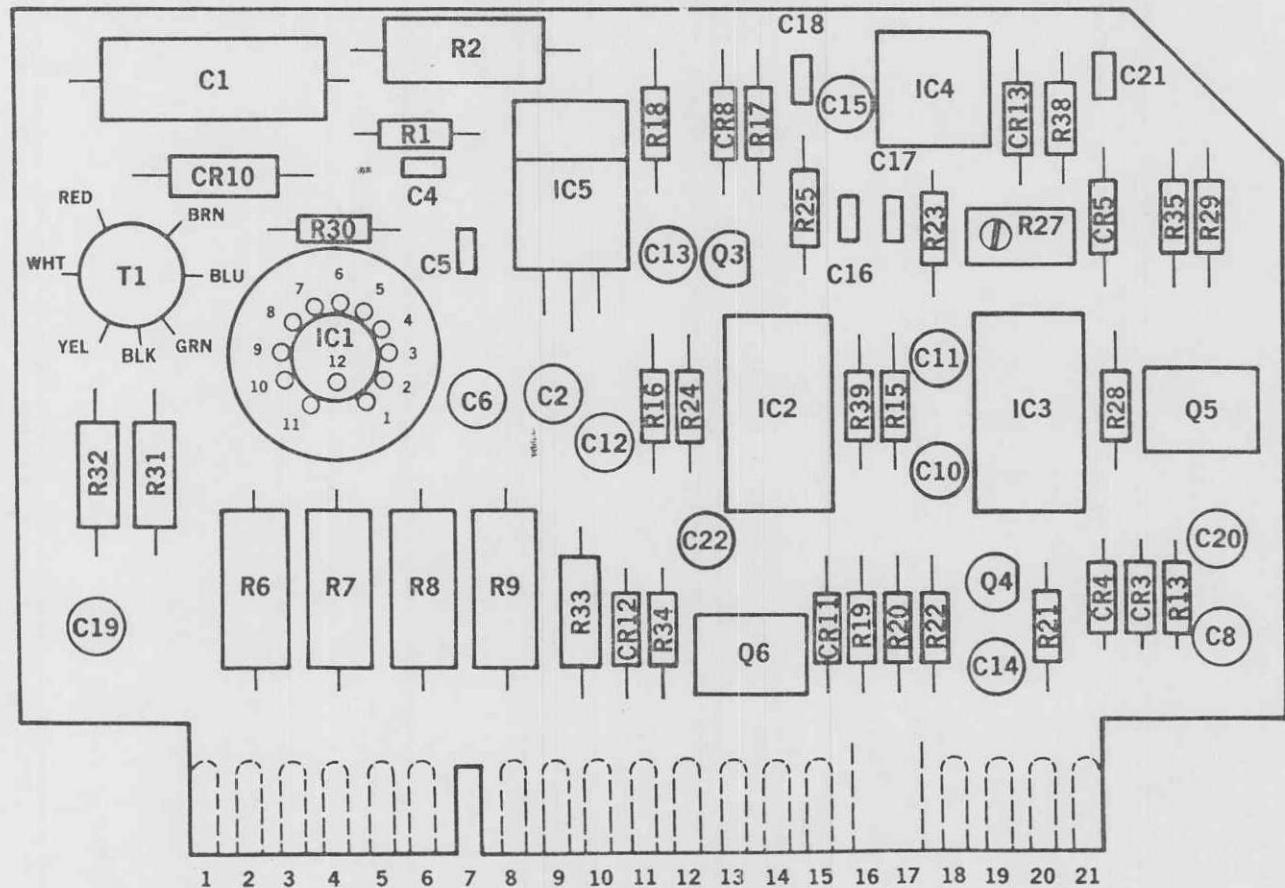


FIGURE 12. PRINTED CIRCUIT PARTS LOCATION  
(Finger Switch Handpiece Units)

## PARTS LIST

1 0 0 A B C J N	1 0 1 A B C J N	1 0 2 A B C J N	Symbol	Figure and Item Number	Dentsply Commodity No.	Part Name	Description
x x x x x x x	x x x x x x x	x x x x x x x	C1	Fig. 11	61500	Capacitor	.047 uf 100V
x x x x x x x	x x x x x x x	x x x x x x x	C1	Fig. 12	61304	Capacitor	100 uf 10V
x x x x x x x	x x x x x x x	x x x x x x x	C2	Fig. 11	62588	Capacitor	.0033 uf 100V $\pm 10\%$
x x x x x x x	x x x x x x x	x x x x x x x	C2	Fig. 12	61305	Capacitor	4.7 uf 35V
x x x x x x x	x x x x x x x	x x x x x x x	C3	Fig. 7, Item 2	62959	Capacitor	1 uf 100V
x x x x x x x	x x x x x x x	x x x x x x x	C4	Fig. 11	61579	Capacitor	.15 uf 75V
x x x x x x x	x x x x x x x	x x x x x x x	C4	Fig. 12	61306	Capacitor	.047 uf 100V $\pm 5\%$
x x x x x x x	x x x x x x x	x x x x x x x	C5	Fig. 11	61171	Capacitor	10 uf 25V
x x x x x x x	x x x x x x x	x x x x x x x	C5	Fig. 12	61386	Capacitor	.0033 uf 100V
x x x x x x x	x x x x x x x	x x x x x x x	C6	Fig. 11	61580	Capacitor	100 uf 12V
x x x x x x x	x x x x x x x	x x x x x x x	C6	Fig. 12	61307	Capacitor	1 uf 35V
x x x x x x x	x x x x x x x	x x x x x x x	C7	Fig. 7, Item 1	62910	Capacitor	1400 uf 75V
x x x x x x x	x x x x x x x	x x x x x x x	C8	Fig. 12	62454	Capacitor	33 uf 10V
x x x x x x x	x x x x x x x	x x x x x x x	C9	Fig. 7, Item 3	62911	Capacitor	2500 uf 25V
		x x x x x x x	C10	Fig. 12	61307	Capacitor	1 uf 35V
		x x x x x x x	C11	Fig. 12	61307	Capacitor	1 uf 35V
		x x x x x x x	C12	Fig. 12	62454	Capacitor	33 uf 10V
		x x x x x x x	C13	Fig. 12	61307	Capacitor	1 uf 35V
		x x x x x x x	C14	Fig. 12	61307	Capacitor	1 uf 35V
		x x x x x x x	C15	Fig. 12	61307	Capacitor	1 uf 35V
		x x x x x x x	C16	Fig. 12	61306	Capacitor	.047 uf 100V $\pm 10\%$
		x x x x x x x	C17	Fig. 12	61386	Capacitor	.0033 uf 100V $\pm 5\%$
		x x x x x x x	C18	Fig. 12	61306	Capacitor	.047 uf 100V $\pm 10\%$
		x x x x x x x	C19	Fig. 12	62454	Capacitor	33 uf 10V
		x x x x x x x	C20	Fig. 12	62454	Capacitor	33 uf 10V
		x x x x x x x	C21	Fig. 12	61386	Capacitor	.0033 uf 100V $\pm 5\%$
		x x x x x x x	C22	Fig. 12	61307	Capacitor	1 uf 35V
x x x x x x x	x x x x x x x	x x x x x x x	CK1		61275	Knob	
x x x x x x	x x x x x x	x x x x x x	CR1	Fig. 7, Item 7	62552	Rectifier	Full Wave
x x x x x x	x x x x x x	x x x x x x	CR2	Fig. 7, Item 6	62551	Rectifier	Half Wave
x x x x x x	x x x x x x	x x x x x x	CR3	Fig. 11	61175	Diode	1N5018A
		x x x x x x	CR3	Fig. 12	62461	Diode	1N4004
		x x x x x x	CR4	Fig. 12	62461	Diode	1N4004

## PARTS LIST (Cont'd)

29

1 MODEL 0 100 0 A B C J N	1 MODEL 0 101 1 A B C J N	1 MODEL 0 102 2 A B C J N	Symbol	Figure and Item Number	Dentsply Commodity No.	Part Name	Description
			CR5	Fig. 12	61344	Diode	1N914B
			CR8	Fig. 12	61344	Diode	1N914B
x x x x x x x	x x x x x x x	x x x x x x x	CR9	Fig. 7, Item 9	62461	Diode	1N4004
			CR10	Fig. 12	61175	Diode	1N5018A
			CR11	Fig. 12	61344	Diode	1N914B
			CR12	* Fig. 12	61344	Diode	1N914B
			CR13	Fig. 12	61344	Diode	1N914B
x x x x x x x	x x x x x x x	x x x x x x x	DP1	Fig. 7, Item 14	61276	Power Indicator Assembly	
x x x x x x x	x x x x x x x	x x x x x x x	DP2	Fig. 7, Item 12	61258	Spur Gear	
x x x x x x x	x x x x x x x	x x x x x x x	DP3	Fig. 7, Item 16	61259	Stop	
x x x x x x x	x x x x x x x	x x x x x x x	DR	Fig. 7, Item 19	61278	Rack Guide	
x x x x x x x	x x x x x x x	x x x x x x x	DW1	Fig. 7, Item 22	61277	Water Indicator Assembly	
x x x x x x x	x x x x x x x	x x x x x x x	F1	Fig. 6, Item 2	61176	Fuse	2A, Slo Blo
x x x x x x x	x x x x x x x	x x x x x x x	F1	Fig. 6, Item 2	62766	Fuse	1A, Slo Blo
x x x x x x x	x x x x x x x	x x x x x x x	F2		62768	Fuse	3 amp Slo Blo 250V
x x x x x x x	x x x x x x x	x x x x x x x	F3		62768	Fuse	3 Amp Slo Blo 250V
x x x x x x x	x x x x x x x	x x x x x x x	F4		62768	Fuse	3 Amp Slo Blo 250V
x x x x x x x	x x x x x x x	x x x x x x x	FP1	Fig. 7, Item 23	61274	Front Panel Assembly	
x x x x x x x			HP1	Fig. 2	61231	Handpiece and Hose Assembly	Standard
			HP2	Fig. 2	61233	Handpiece and Hose Assembly	
		x x x x x x x	HP3	Fig. 2	61232	Handpiece and Reel Assembly	W/Finger Switch
x x x x x x x	x x x x x x x	x x x x x x x	I1	Fig. 7, Item 15	61290	Light Emitting Diode	
x x x x x x x	x x x x x x x	x x x x x x x	IC1	Figs. 11 & 12	62961	Integrated Circuit	A 3020A
			IC2	Fig. 12	62467	Integrated Circuit	946
			IC3	Fig. 12	62469	Integrated Circuit	7474
			IC4	Fig. 12	61240	Integrated Circuit	567
			IC5	Fig. 12	61241	Integrated Circuit	78M05
x x x x x x x	x x x x x x x	x x x x x x x	J2	Fig. 7, Item 13	61179	Receptacle W/Clip	
x x x x x x x	x x x x x x x	x x x x x x x	J2	Fig. 7, Item 13	62549	Receptacle W/Clip	
x x x x x x x	x x x x x x x	x x x x x x x	K1	Fig. 7, Item 25	61263	Relay	48VDC DPDT
x x x x x x x	x x x x x x x	x x x x x x x	PC1	Fig. 7, Item 21	62491	P.C. Board	Standard
x x x x x x x	x x x x x x x	x x x x x x x	PC2	Fig. 7, Item 21	61272	P.C. Board	Finger Switch
x x x x x x x	x x x x x x x	x x x x x x x	Q1	Fig. 7, Item 26	61181	Transistor	MJ900

PARTS LIST (Cont'd)

1 0 0 A B C J N	1 0 1 A B C J N	1 0 2 A B C J N	Symbol	Figure and Item Number	Dentsply Commodity No.	Part Name	Description
x x x x x x x	x x x x x x x	x x x x x x x	Q2	Fig. 7, Item 27	61181	Transistor	MJ900
		x x x x x x x	Q3	Fig. 12	61308	Transistor	2N5551
		x x x x x x x	Q4	Fig. 12	61309	Transistor	2N6028
		x x x x x x x	Q5	Fig. 12	61310	Transistor	H1151
		x x x x x x x	Q6	Fig. 12	61299	Transistor	4N26
x x x x x x x	x x x x x x x		R1	Fig. 11	61182	Resistor	10K 1/2W ±10%
		x x x x x x x	R1	Fig. 12	61242	Resistor	10K 1/4W
x x x x x x x	x x x x x x x		R2	Fig. 11	62443	Resistor	1K 1/2W ±5%
x x x x x x x	x x x x x x x	x x x x x x x	R2	Fig. 12	61243	Resistor	680Ω 1/2W ± 5%
x x x x x x x	x x x x x x x	x x x x x x x	R3	Fig. 7, Item 28	62943-01	Resistor	300Ω10W
x x x x x x x	x x x x x x x		R4	Fig. 11	62953	Resistor	2.7Ω1/2W ± 10%
x x x x x x x	x x x x x x x	x x x x x x x	R4	Fig. 7, Item 29	61303	Resistor	430Ω10W
x x x x x x x	x x x x x x x	x x x x x x x	R5	Fig. 7, Item 11	61264	Potentiometer	250Ω2W
		x x x x x x x	R6	Fig. 12	61244	Resistor	22K 1W
		x x x x x x x	R7	Fig. 12	61244	Resistor	22K 1W
x x x x x x x	x x x x x x x		R8	Fig. 11	62947	Resistor	2.2K 1W ±10%
x x x x x x x	x x x x x x x		R8	Fig. 12	62777	Resistor	560Ω1W
x x x x x x x	x x x x x x x		R9	Fig. 11	62947	Resistor	2.2K 1W ± 10%
		x x x x x x x	R9	Fig. 12	62778	Resistor	390Ω1W
x x x x x x x	x x x x x x x	x x x x x x x	R10	Fig. 7, Item 30	61183	Resistor	.5Ω5W
x x x x x x x	x x x x x x x	x x x x x x x	R11	Fig. 7, Item 31	61183	Resistor	.5Ω5W
x x x x x x x	x x x x x x x	x x x x x x x	R12	Fig. 7, Item 32	62952	Resistor	3.9K 1W
x x x x x x x	x x x x x x x		R13	Fig. 11	61184	Resistor	560Ω1W ± 10%
		x x x x x x x	R13	Fig. 12	62449	Resistor	220Ω1/4W
x x x x x x	x x x x x x	x x x x x x	R14	Fig. 7, Item 8	62472	Resistor	0.5 Ω 10W
x x x x x x	x x x x x x	x x x x x x	R14	Fig. 7, Item 8	60163	Resistor	0.5 Ω 10W
x x x x x x x	x x x x x x x		R15	Fig. 11	61185	Resistor	390Ω1W ± 10%
		x x x x x x x	R15	Fig. 12	62445	Resistor	3.3K 1/4W ± 5%
x x x x x x x	x x x x x x x	x x x x x x x	R16	Fig. 12	62445	Resistor	3.3K 1/4W ± 5%
x x x x x x x	x x x x x x x	x x x x x x x	R17	Fig. 11	61186	Resistor	62Ω1/2W ± 5%
x x x x x x x	x x x x x x x	x x x x x x x	R17	Fig. 12	62447	Resistor	1K 1/4W
x x x x x x x	x x x x x x x	x x x x x x x	R18	Fig. 11	61186	Resistor	62Ω1/2W ± 5%
x x x x x x x	x x x x x x x	x x x x x x x	R18	Fig. 12	61245	Resistor	39K 1/4W

PARTS LIST (Cont'd)

1 0 0 0 A B C J N	1 0 1 1 A B C J N	1 0 102 2 A B C J N	Symbol	Figure and Item Number	Dentsply Commodity No.	Part Name	Description	
			x x x x x x x	R19	Fig. 12	61242	Resistor	10K 1/4W
			x x x x x x x	R20	Fig. 12	62450	Resistor	15K 1/4W
			x x x x x x x	R21	Fig. 12	61246	Resistor	27K 1/4W
			x x x x x x x	R22	Fig. 12	61247	Resistor	1 Meg. 1/4W
			x x x x x x x	R23	Fig. 12	62450	Resistor	15K 1/4W
			x x x x x x x	R24	Fig. 12	62449	Resistor	220Ω 1/4W
			x x x x x x x	R25	Fig. 12	62450	Resistor	15K 1/4W
x x x x x x x	x x x x x x x	x x x x x x x	R26	Fig. 7, Item 33	61261	Resistor	82Ω 1/2W	
			x x x x x x x	R27	Fig. 12	61269	Potentiometer	5K
			x x x x x x x	R28	Fig. 12	62445	Resistor	3.3K 1/4W
			x x x x x x x	R29	Fig. 12	62447	Resistor	1K 1/4W
			x x x x x x x	R30	Fig. 12	61248	Resistor	2.7Ω 1/4W
			x x x x x x x	R31	Fig. 12	61186	Resistor	62Ω 1/2W
			x x x x x x x	R32	Fig. 12	61186	Resistor	62Ω 1/2W
			x x x x x x x	R33	Fig. 12	61261	Resistor	82Ω 1/2W
			x x x x x x x	R34	Fig. 12	61249	Resistor	100Ω 1/4W
x x x x x x x	x x x x x x x	x x x x x x x	R35	Fig. 12	62447	Resistor	1K 1/4W	
x x x x x x x	x x x x x x x	x x x x x x x	R36	Fig. 7, Item 34	61111	Resistor	150Ω	
x x x x x x x	x x x x x x x	x x x x x x x	R37	Fig. 7, Item 35	62472	Resistor	.5Ω 10W	
			x x x x x x x	R38	Fig. 12	61242	Resistor	10K 1/4W
x x x x x x x	x x x x x x x	x x x x x x x	R39	Fig. 12	61242	Resistor	10K 1/4W	
x x x x x x x	x x x x x x x	x x x x x x x	S1	Fig. 7, Item 20	61265	Switch		
x x x x x x x	x x x x x x x	x x x x x x x	S2		61187	Foot Switch and Cable Assy.		
x x x x x x x	x x x x x x x	x x x x x x x	S2		62594	Foot Switch and Cable Assy.		
x x x x x x x	x x x x x x x	x x x x x x x	SC1	Fig. 5, Item 2	61266	Power Cord		
x x x x x x x	x x x x x x x	x x x x x x x	SC1	Fig. 5, Item 2	60164	Power Cord		
x x x x x x x	x x x x x x x	x x x x x x x	SC1	Fig. 5, Item 2	60166	Power Cord		
x x x x x x x	x x x x x x x	x x x x x x x	SC1	Fig. 5, Item 2	60165	Power Cord		
x x x x x x x	x x x x x x x	x x x x x x x	SR	Fig. 5, Item 4	61279	Strain Relief		
x x x x x x x	x x x x x x x	x x x x x x x	STS	Fig. 6, Item 8	61285	Reel Mounting Screw		
x x x x x x x	x x x x x x x	x x x x x x x	SV1	Fig. 7, Item 17	62407	Solenoid Valve		
x x x x x x x	x x x x x x x	x x x x x x x	T1	Figs. 11 & 12	62948	Transformer	Transistor	
x x x x x x x	x x x x x x x	x x x x x x x	T2	Fig. 7, Item 5	61191	Transformer	Power	
x x x x x x x	x x x x x x x	x x x x x x x	T2	Fig. 7, Item 5	62752	Transformer	Power	
x x x x x x x	x x x x x x x	x x x x x x x	WR1	Fig. 7, Item 18	61257	Water Regulator		
x x x x x x x	x x x x x x x	x x x x x x x	XF1	Fig. 7, Item 4	61280	Fuse Holder		

## **WARRANTY**

### **THE DENTSPLY® CAVITRON® 2001™ UNIT**

The Dentsply-Cavitron "2001" Unit is designed for use in a dentist's office and this warranty is not applicable to other uses. The "2001" Unit is warranted against defects arising from faulty materials or workmanship for one (1) year from date of installation. Parts will be repaired or replaced at our option. This warranty extends only to the original purchaser from the dental dealer and is subject to the following conditions:

1. Registration card must be completed and returned to Dentsply within two (2) weeks of date of installation.
2. Any servicing of the Dentsply-Cavitron "2001" Unit must be performed by trained Dentsply Equipment Dealer service personnel.
3. The Dentsply-Cavitron "2001" Unit must not be subjected to abuse or improper installation or application.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. Dentsply neither assumes, nor authorizes any person to assume for it, any other liability in connection with the sale and use of the Dentsply-Cavitron "2001" Unit.

DAMAGES ARE LIMITED STRICTLY TO REPAIR OR REPLACEMENT OF PARTS. DENTSPLY EXPRESSLY DISCLAIMS LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE EQUIPMENT.

Claims covered by this warranty will be honored when presented through your Dentsply Equipment Dealer within one (1) month from discovery of defect.